REMARKS

Claims 1-19 are pending in the application. Claims 1-3, 16, 18 and 19 are rejected. Claims 4-15 and 17 are objected to.

Figure 1 is objected to. A proposed drawing correction is enclosed.

Claims 4-6 have been amended to independent form to include the limitations of claim 1. Claims 4-6 are in condition for allowance which action is respectfully requested. Claims 7-12 are dependent upon one of claims 4-6, therefore claims 7-12 are likewise in condition for allowance.

Claim 13 has been amended to independent form to include the limitations of claims 1 and 3. Claim 13 is in condition for allowance which action is respectfully requested. Claims 14, 15 and 17 are dependent upon claim 13, therefore claims 14, 15 and 17 are likewise in condition for allowance.

Claims 1, 2, 16, 18 and 19 are rejected under 35 U.S.C. § 102(e) as being anticipated by Shou et al. (U.S. 5,910,598) (Shou).

Claims 1, 18 and 19 have been amended to clarify that a receiving device for receiving spread signals which are respectively transmitted over a plurality of channels, each of the plurality of channels carrying different data, in a CDMA communication.

With regard to claims 1-3, 18 and 19 the Office Action asserts that the path detector shown in Fig. 1 of the Shou reference is equivalent to the path detector in applicant's claims.

The Office Action notes on page 3 (p. 4.) that each path is considered as a channel, however applicant respectfully disagrees. Applicant has clarified the claims to include that each of the plurality of channels carrying different data, however the equating a plurality of channels

with a number of n-paths is equating two separate things. Channels carry respectively different signals representing respectively different sets of data while multiple paths, as they prevail in association with one specific channel, convey the same one set of data corresponding to this specific channel over different paths to the receiver. In addition applicant's claim preamble recites the received spread signals are said to be respectively transmitted over a plurality of channels.

The present invention describes a signal-receiving device used in a CDMA communications system and, in particular, a signal-receiving device, which is capable of receiving a plurality of signals transmitted respectively in mutually different channels, in which a path detector is time-divisionally shared among a plurality of despread demodulators.

The Office Action asserts that of Shou teaches the features of claims 1 and says the Maximal n-path Detector 24 of Shou corresponds to the path detector of the present invention and that the Correslator 28-1, . . . 28-n of Shou corresponds to a plurality of despread demodulator of the present invention.

However Shou teaches, the Maximal n-path Detector 24 investigates the time taken for signal transmission with respect to the plurality of paths that prevail under a multi-path environment associated with a communications system. The detection data resulting from the investigation are used, if so required, for controlling operation of the Correlator 28-1, . . . 28-n during a period until the Long Code Timing Detector 25 detects a long code. It appears the Office Action finds this fact to mean that Maximal n-path Detector 24 is shared by the Correlator 28-1, . . . 28-n.

However, Applicant respectfully contends that the Maximal n-path Detector 24 does not perform any time-division related operation for receiving signals conveyed respectively in

multiple channels. In particular applicant claims a path detector, which is used in a time-division manner so as to generate timing signals for the plurality of channels, for generating a timing signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels;

Thus in the present invention as compared to Shou, for example, as shown in Fig. 5B of the present invention, the path detection is performed for channel CH#a during the period between time T1 and time T2 and for channel CH#b during the period between time T2 and time T3. This is indeed the time-division related operation.

This is compared to Shou, where the Maximal n-path Detector 24 does not perform any comparable time division operation with respect to channel CH#b during the period between time T2 and time T3.

For at least the foregoing reasons it is respectfully requested the rejection by Shou be withdrawn and the claims be placed in condition for allowance.

Claim 3 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Shou in view of Watanabe (U.S. 6,307,850).

Claim 3 depends from claim 1 and, in addition, claim 3 recites that the path detector generates the timing signals by using pilot signals for each of the plurality of channels. In column 6, Watanabe describes that the generation of spread codes for each channel (Fig. 7) and that reception data is corrected on the basis of the results of the estimation of the channel conditions from the pilot signal.

However neither cited reference describes the a path detector, which is used in a time-division manner to generate timing signals for the plurality of channels, for generating a timing

signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels.

For at least the foregoing reasons it is respectfully requested the rejection of claim 3 be withdrawn.

Charge $336.00 to Deposit Account 50-1290 for four extra independent claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Versions with markings to show changes made."

In view of the amendments and remarks set forth above, this application is in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged to Deposit Account No. 50-1290.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the claims as follows:

1. (amended) A receiving device for receiving spread signals which are respectively transmitted over a plurality of channels, each of the plurality of channels carrying different data, in a CDMA communication, comprising:

a path detector, which is used in a time-division manner so as to generate timing signals for the plurality of channels, for generating a timing signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels; and

a plurality of despread demodulators, which are arranged for the plurality of channels, for demodulating a corresponding spread signal among the plurality of spread signals included in the input signal according to the timing signal generated by said path detector.

4.(amended) [The] A receiving device [according to claim 1,] for receiving spread signals which are respectively transmitted over a plurality of channels in a CDMA communication, which generates a timing signal by using a plurality of pilot signals for each of the plurality of channels, comprising:

a path detector, which is used in a time-division manner so as to generate timing signals for the plurality of channels, for generating a timing signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread

signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels; and

a plurality of despread demodulators, which are arranged for the plurality of channels, for demodulating a corresponding spread signal among the plurality of spread signals included in the input signal according to the timing signal generated by said path detector,

wherein said path detector comprises:

first path detecting means for detecting a path with a voltage addition operation if a correlation level between pilot signals is high;

second path detecting means for detecting a path with a power addition operation if the correlation between pilot signals is low; and

timing signal generating means for generating the timing signal based on the paths detected by said first and second path detecting means.

5.(amended) [The] A receiving device [according to claim 1,] for receiving spread signals which are respectively transmitted over a plurality of channels in a CDMA communication, which generates a timing signal by using a plurality of pilot signals for each of the plurality of channels, comprising:

a path detector, which is used in a time-division manner so as to generate timing signals for the plurality of channels, for generating a timing signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels; and

a plurality of despread demodulators, which are arranged for the plurality of channels, for demodulating a corresponding spread signal among the plurality of spread signals included in the input signal according to the timing signal generated by said path detector,

wherein said path detector comprises:

path detecting means for detecting a path with an operation for adding an absolute value of correlation level data of each of the plurality of pilot signals; and

timing signal generating means for generating the timing signal based on the path detected by said path detecting means.

6.(amended) [The] A receiving device [according to claim 1,] for receiving spread signals which are respectively transmitted over a plurality of channels in a CDMA communication, [further] comprising:

a path detector, which is used in a time-division manner so as to generate timing signals for the plurality of channels, for generating a timing signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels;

a plurality of despread demodulators, which are arranged for the plurality of channels, for demodulating a corresponding spread signal among the plurality of spread signals included in the input signal according to the timing signal generated by said path detector; and

priority information storing means for storing information about priorities of the plurality of despread demodulators, wherein

said path detector operates for a despread demodulator determined based on the priority information stored in said priority information storing means.

13.(amended) [The] A receiving device [according to claim 3,] for receiving spread signals which are respectively transmitted over a plurality of channels in a CDMA communication, [further] comprising:

a path detector, which is used in a time-division manner so as to generate timing signals for the plurality of channels, for generating a timing signal corresponding to each of the plurality of channels according to a correlation between an input signal including the spread signals which are respectively transmitted over the plurality of channels and a spread code corresponding to each of the plurality of channels;

a plurality of despread demodulators, which are arranged for the plurality of channels, for demodulating a corresponding spread signal among the plurality of spread signals included in the input signal according to the timing signal generated by said path detector;

a memory for storing input signals; and

memory controlling means for reading the input signals from said memory and for providing said path detector with [the] read signals, when the timing [timings] of [the] pilot signals on the plurality of channels overlap, wherein

a spread signal transmitted over each of the plurality of channels includes the pilot signals inserted at predetermined intervals,

said path detector generates the timing signal by using the pilot signals for each of the plurality of channels, and

said path detector sequentially generates timing signals corresponding to the channels by using the pilot signals on the plurality of channels.

18.(amended) A receiving device for receiving spread signals which are respectively transmitted over a plurality of channels, each of the plurality of channels carrying different data, in a CDMA communication, comprising:

a path detector, which operates in a time-division manner, for detecting delay profiles for the plurality of channels and for generating a timing signal corresponding to each of the channels based on the delay profiles; and

a plurality of despread demodulators, which are arranged for the plurality of channels, for demodulating a corresponding spread signal among a plurality of spread signals included in an input signal according to the timing signal generated by said path detector.

19.(amended) A receiving device for receiving spread signals which are respectively transmitted over a plurality of channels, each of the plurality of channels carrying different data, in a CDMA communication, comprising:

a plurality of despread demodulators, which are respectively arranged for the plurality of channels, for demodulating a spread signal transmitted over a corresponding channel by despreading the spread signal with a corresponding spread code; and

instructing means for instructing a phase of each spread code used for spreading each of the spread signals transmitted over the plurality of channels, wherein

said instructing means is shared by the plurality of despread demodulators.